DOCUMENT RESUME

ED 315 129 JC 900 117

TITLE	The High Tech Centers for the Disabled.
INSTITUTION	California Community Colleges, Sacramento. Office of the Chancellor.
PUB DATE	Mar 90
NOTE	35p.; Discussed as Agenda Item 7 at a meeting of the Board of Governors of California Community Colleges (Sacramento, CA, March 8-9, 1990).
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Accessibility (for Disabled); Assistive Devices (for Disabled); Community Colleges; *Computer Science Education; *Computer Uses in Education; *Disabilities; Learning Disabilities; Physical Disabilities; Physical Mobility; Program Effectiveness; State Programs; Student Attrition; *Student Characteristics; Teacher Response; Two Year Colleges; Visually Handicapped Mobility
IDENTIFIERS	*California

ABSTRACT

A statewide network of High Tech Centers for the Disabled (HTCD) was developed to increase disabled student retention in the California community colleges by providing student access to computer technology and training, as well as an array of training and technical support services for community college faculty. This report presents a brief history of the centers and reviews two outcomes studies that examined the characteristics of students served by the program and the satisfaction of community college faculty who received training through the HTCD program. In addition, the report contains a discussion of current and future services and programs. The first section discusses the development and rapid growth of the HTCDs, which were established at 51 community colleges throughout the state in 1986 and currently serve more than 5,000 students. The second section reviews study findings related to students' age, ethnicity, disability type, educational goals, gender, grade level first introduced to computers, and ease of computer use before and after HTCD training; and satisfaction of faculty with the program. The study findings indicated that more than 60% of the students were receiving their first exposure to computers; students across all ethnic, gender, and disability groups were making substantial gains in the ease and confidence with which they use microcomputers; and faculty reported dramatic gains in their confidence and ability to teach the disabled. The third section of the report discusses HTCD training for faculty, which includes inservice training, telephone support, site visits, regional meetings, and training books, guides, and manuals. The final section looks at issues the HTCD will face in the future including a transition of funding for campus-based HTCD faculty from the initial grant to local funding and a new, permanent location for the HTCD training center. Charts and graphs are appended. (WJT)

ED315129

The High Tech Centers for the Disabled.

March 8-9, 1990

JC 900 117

Prepared as Agenda Item Number 7 at a meeting of the Board of Governors of California Community Colleges (Sacramento, CA, March 8-9, 1990).

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

J. Smith

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☒ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

Board of Governors
California Community Colleges
March 8-9, 1990

THE HIGH TECH CENTERS FOR THE DISABLED 7

A Report

Background

Through its Disabled Students Programs and Services (DSP&S) unit, the Chancellor's Office has instituted a number of systemwide programs to assist disabled students in successfully completing their college education. Among the newest programs developed by the DSP&S unit is the systemwide network of High Tech Centers for the Disabled.

For disabled and nondisabled students alike, access to computers is becoming an increasingly critical factor in successfully completing a college education. For students with disabilities, assistive computer technologies provide alternative methods for viewing the computer screen, using the computer keyboard, and benefiting from computerized productivity tools. The net result of these technologies is enhanced opportunity for access to and success in higher education.

Analysis

The report that follows presents a brief history of the High Tech Centers program, a review of two outcomes studies that examined the characteristics of students served by the program and the satisfaction levels of community college faculty who have received training through the High Tech Centers program, a discussion of services provided by the program, and future program directions.

The High Tech Centers program was begun in October 1986 as a cooperative undertaking between the California State Department of Rehabilitation (DR) and the Chancellor's Office. A series of grants from DR totaling $5.5 million were awarded to The Community College Foundation to provide start-up monies, High Tech Center staff, and equipment at 51 community colleges throughout the state. Additionally, the grant funds provided for equipment and staff for the High Tech Center Training Unit at the Chancellor's Office. Subsequently, as grant funds ended, the Training Unit was successfully funded in the Governor's 1989-90 Budget at $571,000. The

program has grown rapidly and proven to be of great value to both students and faculty. More than 5,000 students are currently enrolled in High Tech Centers.

Outcomes studies conducted by the High Tech Center show that:

- For more than 60 percent of students, the program provides a first exposure to both computers and assistive computer technology;
- Students across all ethnic, gender, and disability groups make substantial gains in the ease and confidence with which they can use microcomputers;
- After receiving training through the High Tech Center, community college faculty report dramatic gains in their confidence and ability to teach students the use of assistive computer technology; and
- Faculty are highly supportive of the services provided by the High Tech Center program.

The High Tech Center Training Unit provides an extensive array of training and technical support services for community college faculty. These include extensive in-service training; telephone support; site visits; regional specialist meetings; development of a comprehensive set of training guides, books, and manuals; and an electronic bulletin board that links the High Tech Centers.

In the coming months, two major issues face the High Tech Centers (HTC) program.

- Transition of funding for campus-based HTC faculty from the initial Foundation grant to local assistance.

In June 1990, funding of campus-based High Tech Center faculty from the initial Foundation grant will expire. To prevent serious disruption of High Tech Center services, the Chancellor's Office has submitted a budget change proposal to the Governor for $1.7 million in local assistance to meet the cost of maintaining highly trained and experienced faculty at all of the community college High Tech Centers.

- Determination of an appropriate, permanent location for the High Tech Center Training Unit.

Given the expansion of training and support that has occurred over the past three years, questions have arisen as to the best permanent location for the Training Unit.

It might well be appropriate to consider moving the High Tech Center Training Unit, now in Sacramento, given: 1) the location of High Tech Centers programs throughout the state, 2) the growing need to include students in the testing and evaluation of new technologies, 3) the expansion of cooperative undertakings with business and

industry, and 4) the participation in the program by other segments of higher education.

The High Tech Centers for the Disabled have been, by any standard, an enormously successful and effective program. The program and the resource materials it has produced are now the national standard against which all other programs are measured or modeled. Maintaining that lead will require innovation, commitment, and a sincere desire to provide equal educational opportunities through which students can succeed on the basis of their own merits, rather than falter on the circumstances of their disability.

Staff Presentation: *William J. Cordero, Vice Chancellor*
Student Services

Catherine Campisi, Coordinator
Disabled Students Programs and Services

Carl Brown, Director
High Tech Center for the Disabled

The High Tech Centers for the Disabled

California has a long history of providing specialized educational programs for the disabled. As early as 1860, a State-supported school for deaf and blind children had been established in San Francisco. Motivated in part by Section 504 of the newly enacted Federal Rehabilitation Act of 1973, which read:

> ". . . no otherwise qualified handicapped person, shall, on the basis of handicap, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity that receives or benefits from federal financial assistance."

The Legislature embarked on a landmark reform designed to enhance educational opportunities for the disabled in each of California's three public segments of higher education: the University of California, the California State University, and the California Community Colleges.

In 1976, passage of Assembly Bill 77 (Chapter 2, Statutes of 1976) marked a turning point in the lives of thousands of disabled Californians. This bill authorized development of State funded instruction and support services for students with disabilities in the California Community Colleges. Prior to the bill's passage, the California Community Colleges, with a statewide enrollment of nearly 1 million students, enrolled fewer than 5,000 disabled students. In the twelve years since then, the number of disabled students attending California Community Colleges has grown to more than 50,000 annually.

Although disabled students are attending the Community Colleges in ever increasing numbers, their level of academic preparation for higher education is often inadequate (Horn, Shell & Severs, 1986). Whether this is a consequence of limited educational opportunity in K-12 or a reflection of the educational process for students with disabilities is yet to be determined. Under the mandate of AB 77, the Chancellor's Office has, through its Disabled Students Programs and Services [DSP&S] unit, instituted a number of systemwide programs to assist disabled students in successfully completing their college education.

Among the newest programs developed by the DSP&S unit is the systemwide network of High Tech Centers for the Disabled. For disabled and nondisabled students alike, access to computers is becoming an increasingly critical factor in successfully completing a college education. Assistive computer technologies provide alternative methods for students with disabilities to view the computer screen, use the computer keyboard, and benefit from computerized productivity tools. The net result is enhanced opportunity for access to and success in higher education.

A Brief History of the High Tech Center Program

In the spring of 1984, the DSP&S program at Monterey Peninsula College began offering courses in word processing to students with disabilities. Within the first week of classes, the difficulty of using microcomputers, even for students with relatively mild orthopedic disabilities, was obvious. How, for example, could a student having only one finger with which to type hold down two keys at once?

Through trial and error, effective solutions to these access difficulties were developed. Course enrollment increased dramatically. Disabled individuals who had never considered attending college were enrolling at Monterey Peninsula College to learn word processing using assistive computer technology. And they were staying on to enroll in mainstream courses.

After careful consideration, the college determined there was a real need for a systematic program of identification, testing, and implementation of assistive computer technology for students with disabilities. The college's High Tech Center would be a training facility where students would come to learn the use of assistive computer technologies appropriate to their disability. When a functional level of competency had been attained, students would make the transition to mainstream courses where, if computers were used, assistive computer technology would be available.

The success of the program at Monterey Peninsula College led many other community colleges to establish High Tech Centers of their own. Responding to the obvious academic and vocational benefits of these early programs, the Chancellor's Office established, in June 1986, a systemwide High Tech Center Training Unit in Sacramento. The center was charged with providing support and training in assistive computer technology for High Tech Centers faculty in California Community Colleges, and with exploration, evaluation, and implementation of new and emerging technologies of potential benefit to students with disabilities.

Between October 1986 and June 1988, the California State Department of Rehabilitation, in cooperation with the Chancellor's Office, awarded a series of grants totaling $5.5 million to The Community College Foundation to establish High Tech Centers in California Community Colleges based on the model developed at Monterey Peninsula College. The 1989-90 Governor's Budget provided $571,000 to fund the High Tech Centers Training Unit at the state level to provide systemwide leadership and training for faculty and staff in the community colleges. Presently, there are 51 High Tech Centers funded through this cooperative undertaking located at community colleges throughout the state. Several other sites in both the K-12 and four-year segments of higher education were also funded. An additional 14 community colleges have independently established High Tech Center programs. (See Appendix A.) At the present time, community college High Tech Centers range in enrollment from 30 students to more than 200 on some campuses. Average program enrollment is approximately 40 students. Programs typically are coordinated by specialists possessing a master's degree in either Learning, Speech and Language, Visual, or Physical Disabilities.

The intent of each program is to provide low-vision, blind, deaf and hard-of-hearing, learning disabled, physically disabled, and brain-injured students with training in, and access to, assistive and instructional systems that will enable them to compete effectively in both the classroom and the work place. This year, nearly 6,000 students with disabilities, more than ten percent of all students enrolled in DSP&S programs, will participate in the program, making it the largest project ever undertaken, either nationally or internationally, to provide disabled students in postsecondary education with full access to microcomputers.

Outcomes and Accomplishments

During the three years in which the Chancellor's Office High Tech Center for the Disabled has been in operation, it has undertaken and completed a variety of outcomes studies, support services, publications, and cooperative agreements intended to enhance the success of students with disabilities enrolled in the California Community Colleges. The High Tech Center has completed two major outcomes studies:

1. *Characteristics of Students with Disabilities Enrolled in the California Community Colleges High Tech Centers for the Disabled*

   To learn more about the population of students with disabilities enrolled in High Tech Center programs, the Chancellor's Office conducted a study based on data collected from students who enrolled in and completed a first semester High Tech Center course (Computer Access 1) between June 1987 and June 1988 (n = 555). The 25 colleges included in the study were located in rural, suburban, and urban settings.

   This descriptive study set out to identify the characteristics of a sample of 555 students with disabilities enrolled in campus High Tech Centers. It examined the students from three different but interrelated viewpoints: general characteristics of the entire sample, characteristics of the sample by type of disability, and characteristics of the sample by gender.

   - General Characteristics

   From an analysis of the general characteristics of students with disabilities enrolled in the High Tech Centers programs, a fairly distinct picture emerges:

   > Campus High Tech Centers are used fairly equally by both males and females, with usage by males slightly greater. The program is used predominantly by Whites, followed by Hispanics and then Blacks. A large percent (34%) of students using the campus centers are generally younger (between 19 and 24 years old) than most community college students. Students with learning, orthopedic, or multiple disabilities

make up the majority the participants in the program, followed by students with visual disabilities. (See Figures 1, 2, and 3.)

Figure 1: Age of Participants.

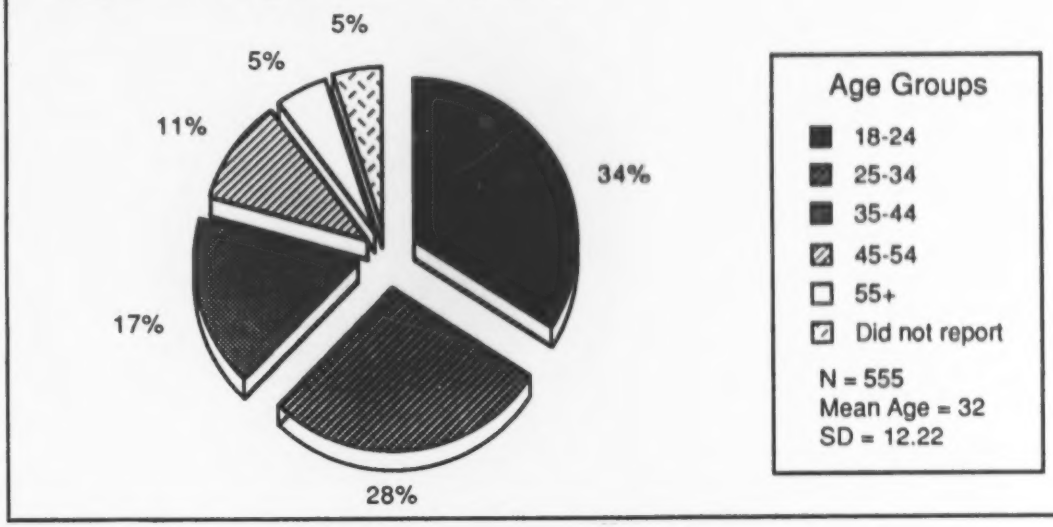
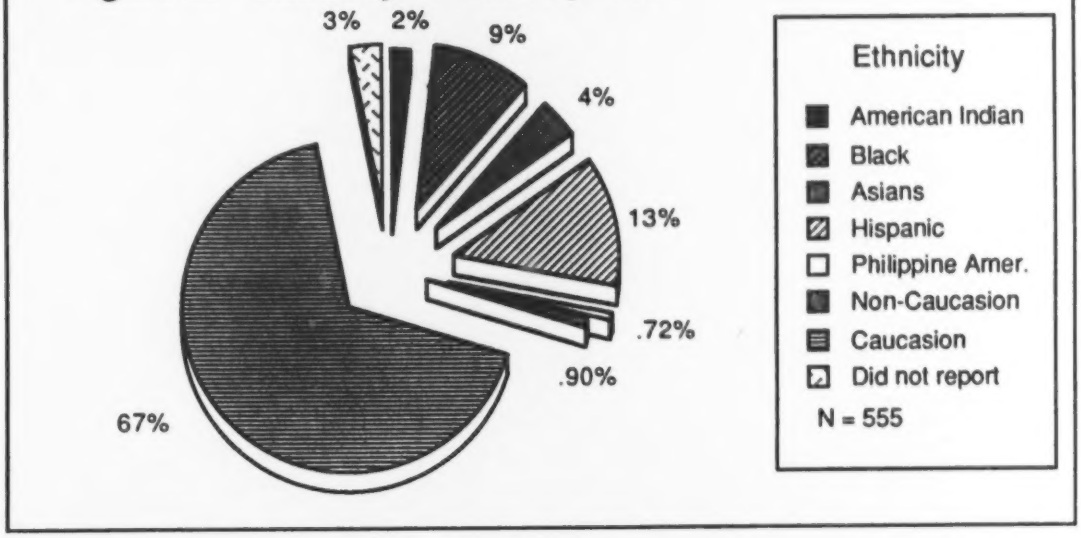
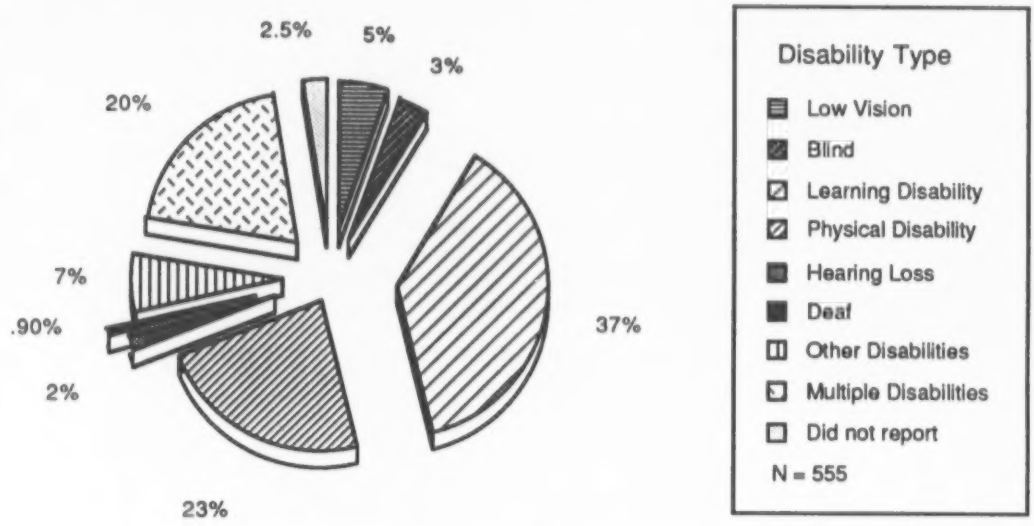


Figure 2: Ethnicity of Participants



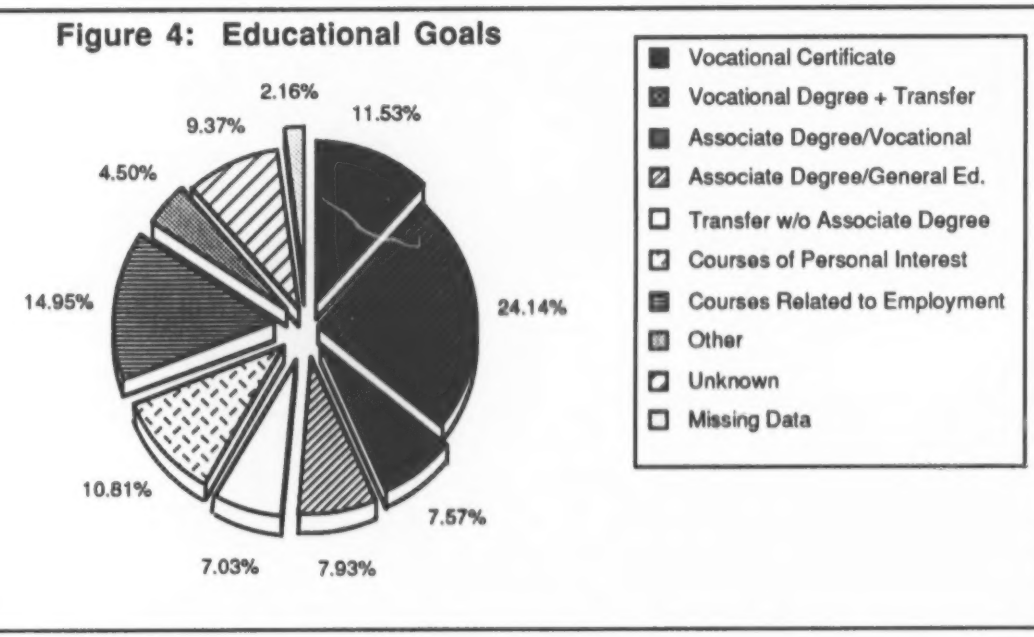
For the most part, students in the campus High Tech Centers program are very likely entering college for the first time and plan on transferring to a four-year institution. Most students in the sample enrolled in the program to increase

Figure 3: Participants Disability Type



their chances of success in other classes, but some did so to improve job skills, or for personal or other reasons. (See Figure 4.)

Figure 4: Educational Goals



Whereas the students in the sample were probably exposed to computers for the first time between the ninth and twelfth grades, the High Tech Center very likely provided their first experience with assistive computer technologies.

(See Figure 5.) Before enrolling in the High Tech Centers, students generally found computer use "moderately difficult to difficult." After completing the course, they found computer use "moderately easy to easy" and were confident of their ability to use assistive technologies. (See Figure 6.)

Figure 5: Grade Level First Introduced to Computers & Computer Access.

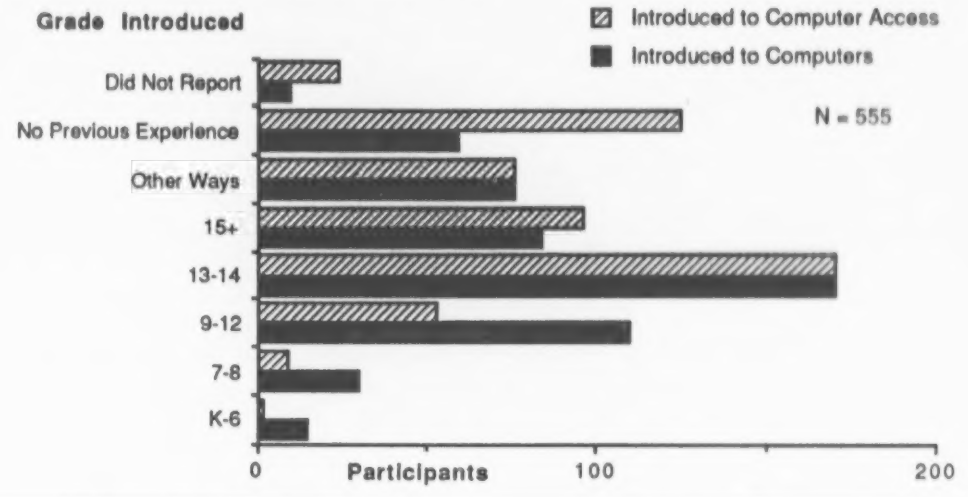
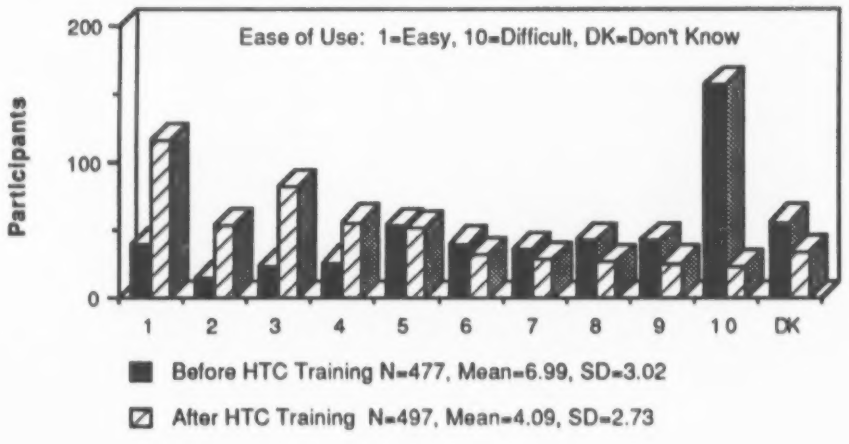


Figure 6: Ease of Computer Use Before and After High Tech Center Training



It is also interesting to observe that while most disabling conditions occur prior to age 18 (the mean age is 11.5 years, with most disabilities occurring at birth), the majority of students in the sample had gone through the first twelve years of their education without access to computers.

With regard to the quality of instruction received, students reported a high level of confidence in the ability of the faculty to answer questions about computer access, select appropriate computer access systems, and assist with special learning needs.

Disabled ethnic minority students in the sample were underrepresented in relationship to the state's general college-going population, while White students were overrepresented. Although, to some extent, this may be due to differing cultural responses to disabling conditions, the observed pattern of minority underrepresentation among students with disabilities is consistent with that of ethnic minority students in the California Community Colleges in general (Kanter, 1989).

- Characteristics of Students by Type of Disability

The data in this study were analyzed to determine if any demographic characteristics, patterns of educational history, academic goals, or levels of program satisfaction were unique to a particular disability group or groups.

Students in the study with learning or physical disabilities were predominantly between 18 and 34 years old, with the majority ranging from 18 to 24. The "bulge" in the latter age group was common to the majority of disability types considered in the study. This may reflect expanded efforts made over the last ten years by State and federal agencies to improve educational and college transfer opportunities for students with disabilities in K-12.

The population of blind or low-vision students in the sample was generally older. This finding is consistent with other studies of blind and low-vision populations. Although this seems particularly true of blind students, students with low-vision appear to be equally divided between "typical" college-age students and older adults.

Across all ethnicity groups, a learning disability was the single most common disability type. In the study, Hispanic and American Indian students appeared to have unusually high percentages of learning disabilities in relationship to the total sample.

Physical and multiple disabilities were, respectively, the second and third most common disability types across all ethnic groups. With sample sizes of ($n<4$) excluded from the analysis, Black students had the highest percentage of physical disabilities, while Asian students had the highest percentage of

multiple disabilities. Asian students also had dramatically higher percentages of low-vision and blindness than any other ethnic group.

No clear patterns emerged with regard to educational goals by type of disability. Students in the study were virtually indistinguishable from the general group of community college students in their educational goals, although a somewhat larger percentage of students with disabilities were enrolled in personal development courses.

With regard to improved ease of computer use after High Tech Centers training, major gains were made by all disability types. Low-vision and blind students reported the greatest gains in ease of computer access, followed next by students with physical disabilities and then by those with learning disabilities. This is due most likely to the specificity and sophistication of access systems for low-vision, blind, and physically disabled students versus the more generalized types of computer access systems available for those with learning or other types of disability. (See Figure 7.)

Although all disability groups reported having gained high levels of confidence in their ability to use special access systems, again, low-vision, blind, physically, and learning disabled students were the most confident. This is, perhaps, a powerful indicator of the effectiveness of computer access systems that have been designed to meet the specific needs of particular disability groups, especially low-vision, blind, and physically disabled.

- Characteristics of Students by Gender

Although evaluation of the data by gender revealed a fairly even distribution of males and females across disability groups, slightly more of the males were learning disabled. This is consistent with gender distribution findings in other studies of students with learning disabilities. In this study, females with visual disabilities out-numbered males nearly two to one.

A much more important finding concerned major differences in the grade levels at which males and females with disabilities were first introduced to computers. Whereas 32 percent of the males had been introduced to computers before the twelfth grade, only 20 percent of the females had been similarly introduced—a 12 percent difference. These findings suggest that females are at a disadvantage in that fewer are introduced to computers and computer access during their high school years. The low incidence of familiarity with computers (especially among females) could have an impact on subsequent educational preparation and performance. (See Figures 8 and 9.)

Figure 7: Ease of computer use before and after High Tech Center training.

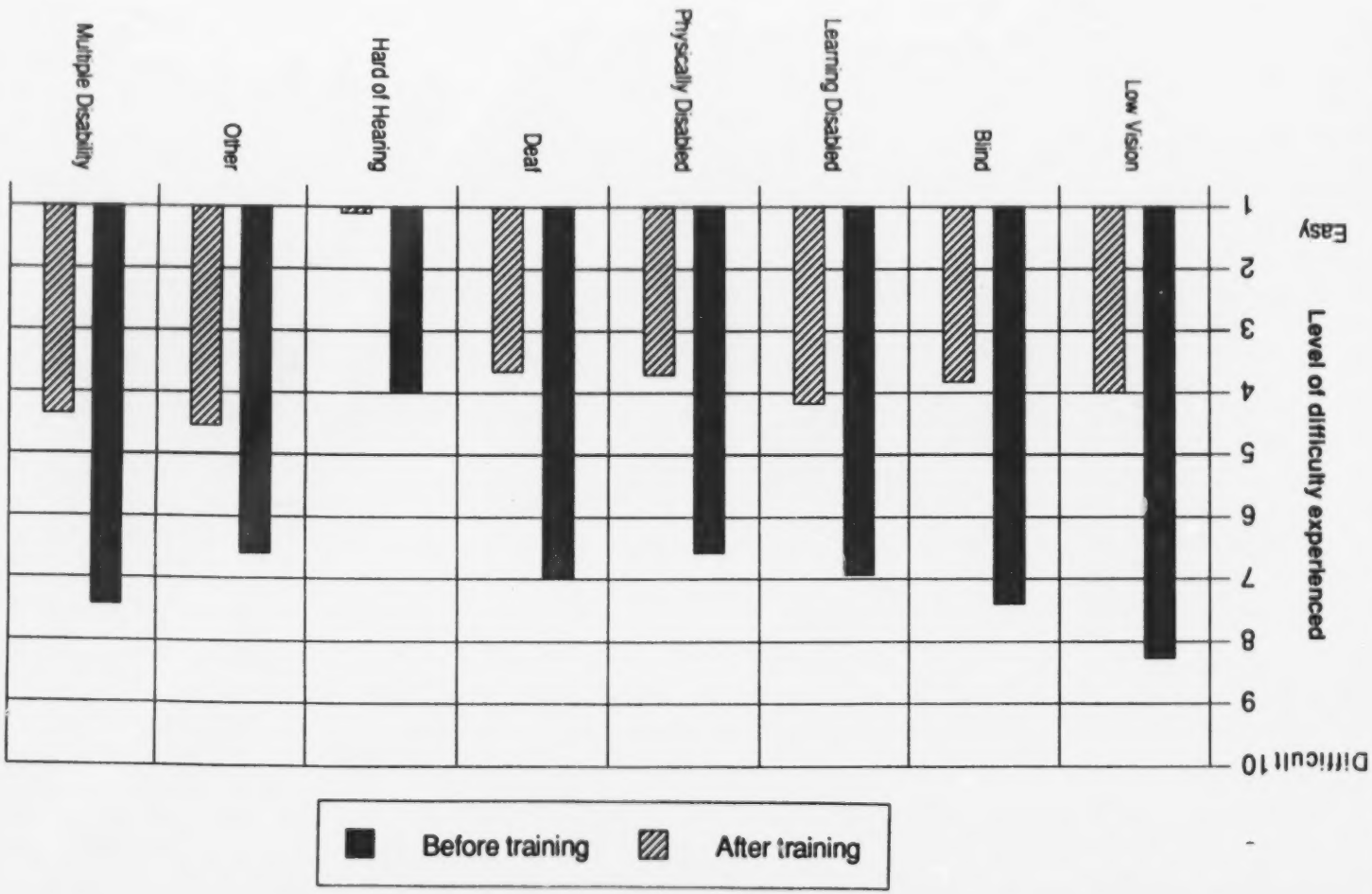


Figure 8: Grade level first introduced to computers.

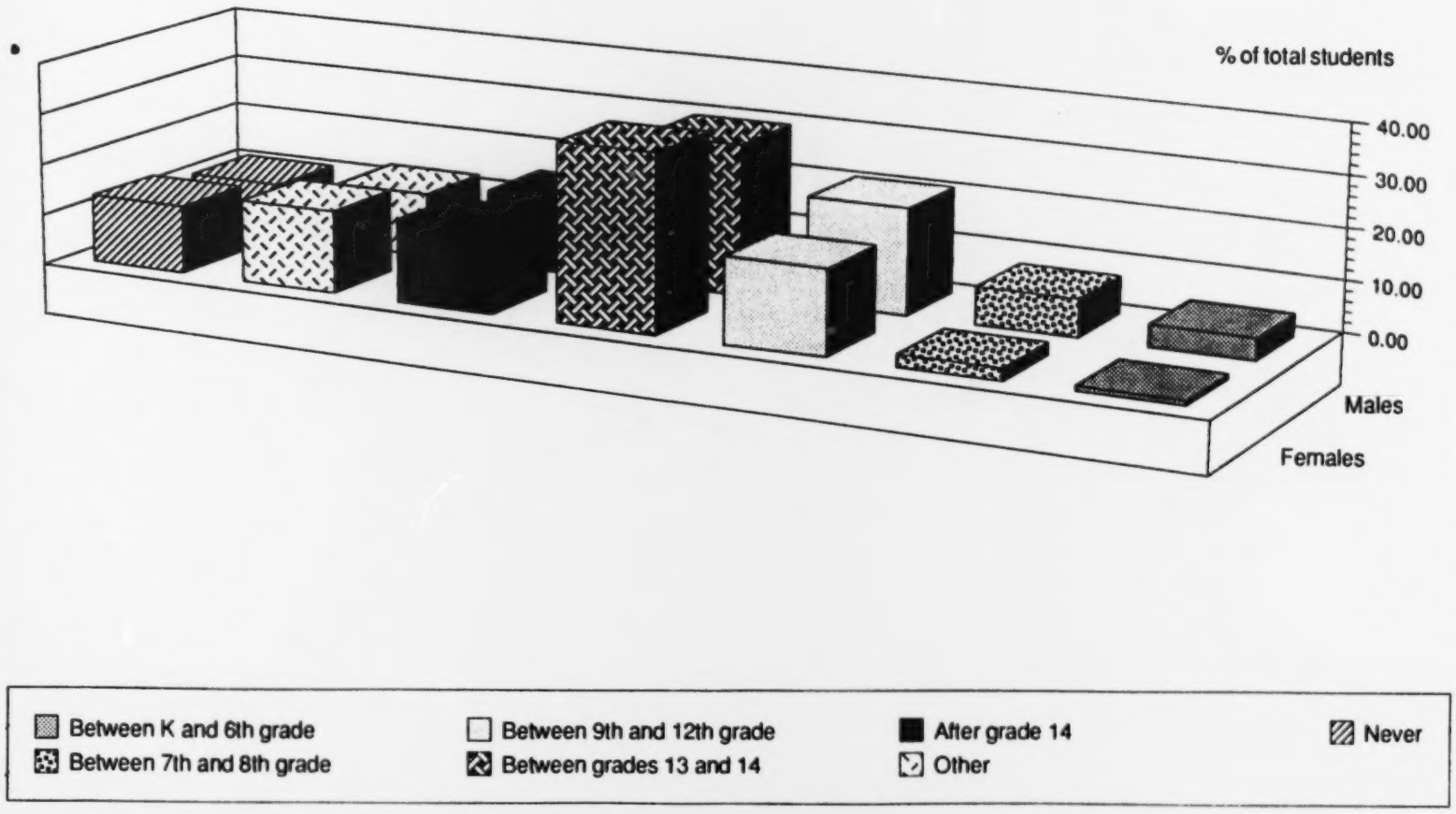
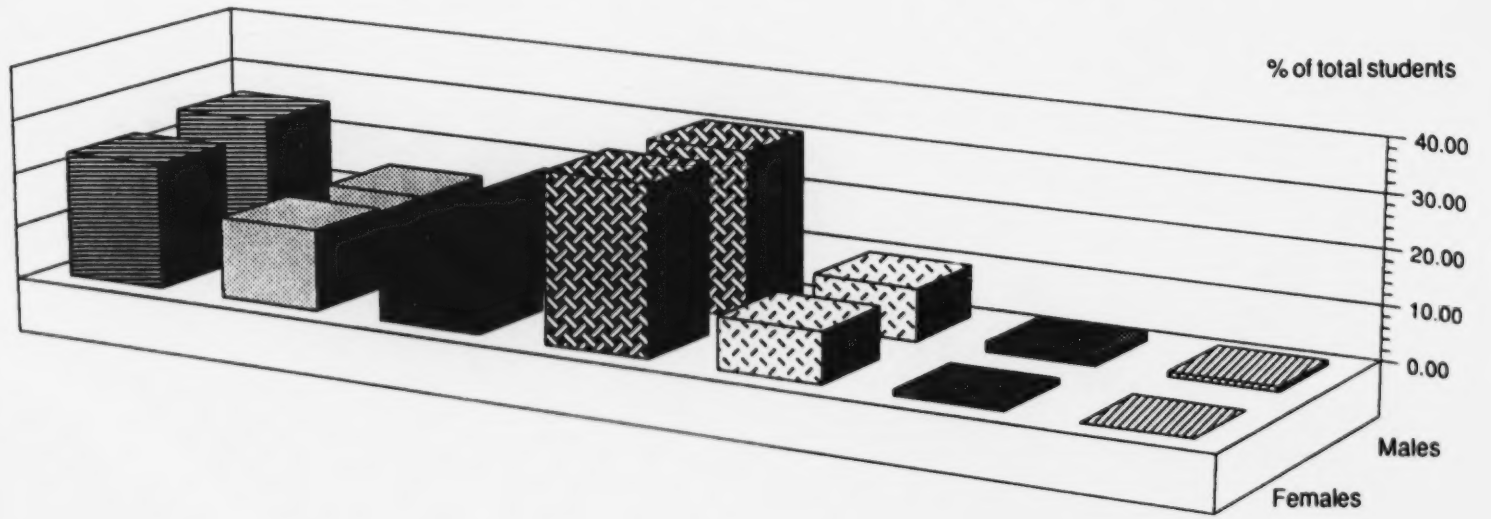


Figure 9: Grade level first introduced to computers with access.



Between K and 6th grade
Between 7th and 8th grade
Between 9th and 12th grade
Between grades 13 and 14
After grade 14
Other
Never

What is evident from this study is that the majority (at least 60%) of male and female students with disabilities received their first introduction to both computers and assistive computer technologies in a community college setting and most likely at a High Tech Center for the Disabled.

This study revealed a tendency for disabled females to enroll in vocational-track or employment-related courses more frequently than disabled males. Also, disabled females appeared less likely to enroll in courses leading to transfer to four-year degree programs than disabled males. These findings suggest that colleges may need to provide additional counseling for disabled females entering college for the first time. The findings from this study may also indicate that an increasing number of older disabled females are returning to college for retraining or to improve job skills.

In examining ease of computer use for males and females before and after High Tech Centers training, females reported considerably higher levels of difficulty in using a computer than did males, but greater ease in using a computer after training than did males. The initially high levels of difficulty experienced by females may be due in part to a lack of familiarity with computers in K-12. (See Figure 10.) Their increased ease in using computers, after training, as compared to males, remains unexplained and may be investigated in future studies of this type.

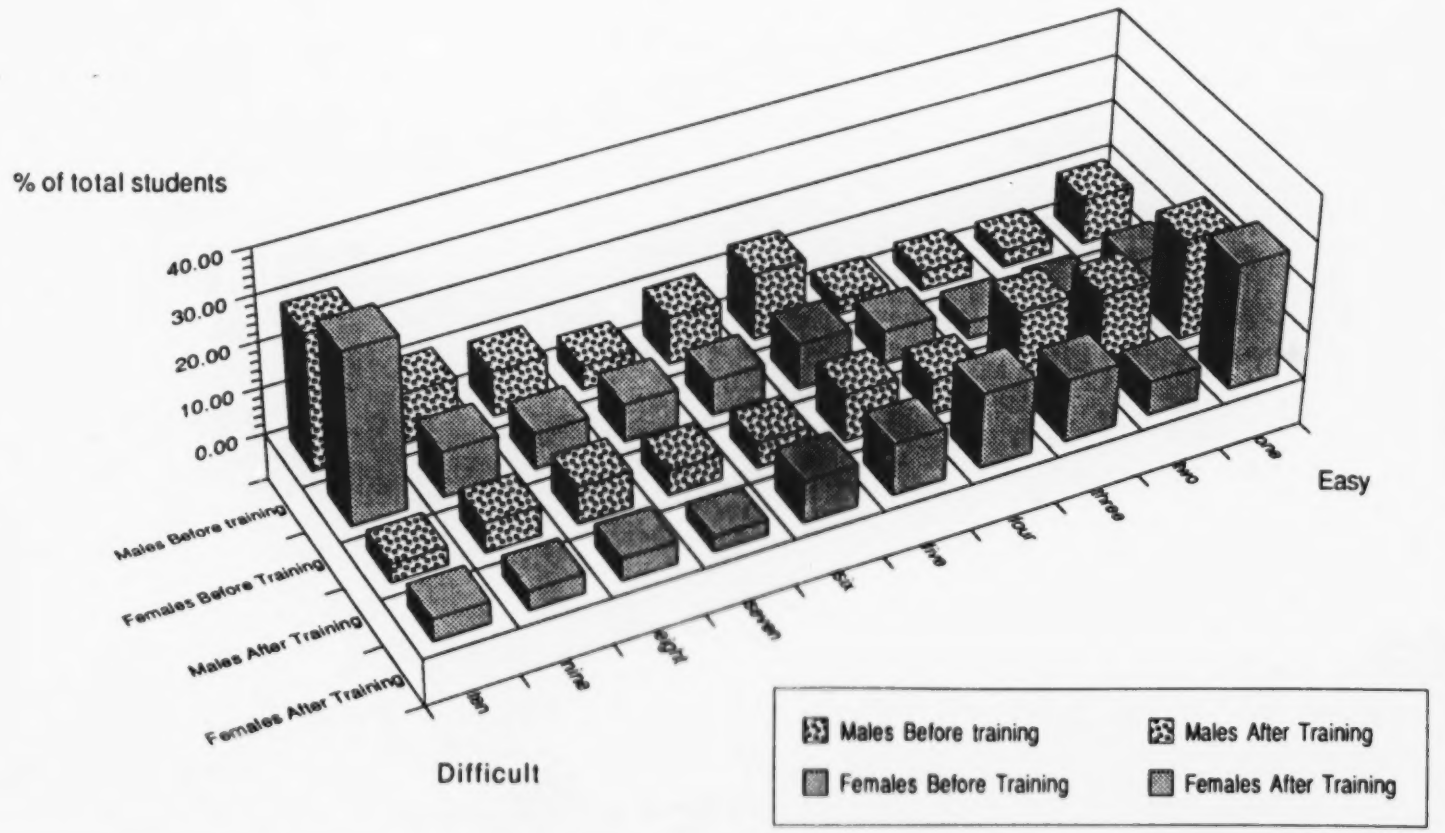
Males and females appeared to differ only slightly in regard to their high levels of confidence in the ability of High Tech Centers staff to select appropriate assistive computer technologies, a moderately strong belief in the importance of computer access to help with graduation from college, and a moderate belief (with females slightly more uncertain than males) that disability would affect opportunities for employment.

Conclusions

In some respects, what is most striking about the students in the study was their similarity to able-bodied community college students. Their ages, ethnicities, and educational goals were virtually indistinguishable from the overall statewide population of nondisabled community college students.

As is the case on many community college campuses, disabled ethnic minorities remain seriously underrepresented, even as subsets of minority populations on campus.

Figure 10: Ease of computer use before and after HTC training



Students participating in High Tech Centers programs appeared to have great confidence in the professional ability of the instructional faculty. Across all ethnic, gender, and disability groups, students made substantial gains in the ease and confidence with which they could use microcomputers. These gains should be readily observable in future studies as they are translated into improved academic performance, higher rates of transfer to four-year colleges and universities, and enhanced job placement over the coming years.

The California Community Colleges program of High Tech Centers for the Disabled appears to play a major role in introducing persons with disabilities to both computers in general and computer access technologies in particular. For the overwhelming majority of students in this sample, who ranged from 18 to 34 years old, the High Tech Centers most likely provided their first opportunity to learn both computer usage and the operation of computer access technologies. This is a tremendous responsibility as well as an enormous opportunity for the High Tech Centers programs.

California's rapidly changing demographic make-up points unflinchingly towards a tomorrow in which the unique characteristics and needs of diverse ethnic and social groups will be the norm rather than the exception. Within this rapidly changing structure, there is an unprecedented opportunity for persons with disabilities to establish a claim on the availability and shape of a computer technology that will sculpt the shape of our lives into the far distant future.

2. *Satisfaction Levels of California Community College Faculty With Training and Support Provided by the High Tech Center Training Unit.*

One of the most critical elements in the development of this new High Tech Center resource has been the training of instructional faculty in the use of hardware and software based assistive computer technologies. More than 200 faculty have participated in training at the High Tech Center Training Unit. An outcomes study was conducted to evaluate trainee satisfaction with the ability of the High Tech Centers instructional staff to present complex technical information in a clear and understandable manner, answer questions completely, establish effective instructional time frames, and teach at a pace that was "just right."

To develop such information, the study examined the entire population of faculty who completed training sessions offered by the Training Unit between April 1987 and September 1988 (n=214). Data for the study were gathered from post-training evaluation questionnaires.

This descriptive study proposed as its research question: "What is the level of satisfaction with training received by instructional specialists [High Tech Center faculty] who completed courses at the High Tech Center Training Unit?"

The characteristics to be examined included: training content, training format, trainee future needs, and trainee confidence levels.

Conclusions

In summary, the data collected revealed that faculty participants were very satisfied with the ability of the Training Unit's staff to communicate information about complex technical matters in a clear and understandable manner. Participants were also well-satisfied with the fashion in which their questions were answered during the training process. (See Figures 11 and 12.)

Figure 11

Information about cognitive rehabilitation and software applications (computer equipment and software) was presented in a clear and understandable manner.

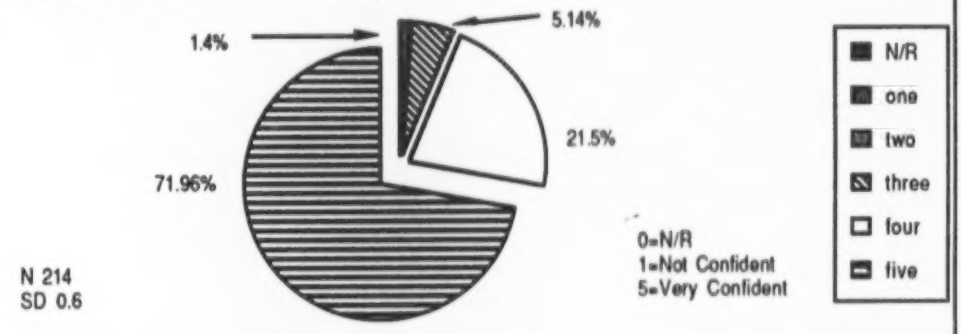
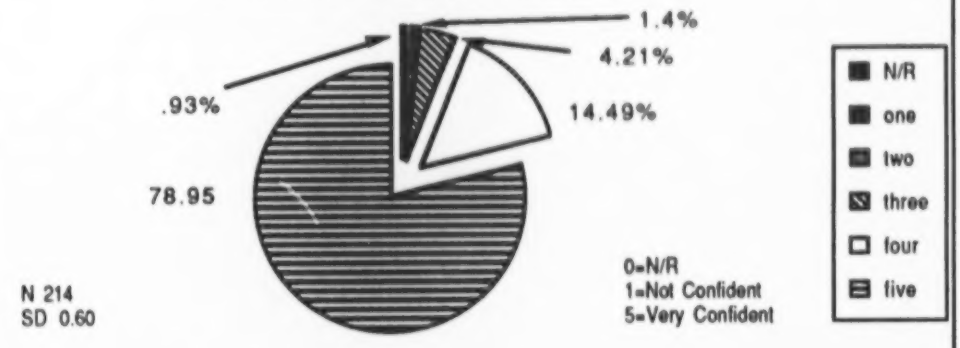


Figure 12

The instructors answered my questions completely.



Although the majority of participants were satisfied with the length and pace of the training, approximately 18 percent reported that the training period was a little too short, while another 20 percent reported that the pace of the training was a little too fast. These responses have been taken into account and are reflected in the altered pace of High Tech Center training sessions. (See Figures 13 and 14.)

Figure 13

The three day training period was: 1. Too short, 2. A little too short, 3. Just right, 4. A little too long, 5. Much too long.

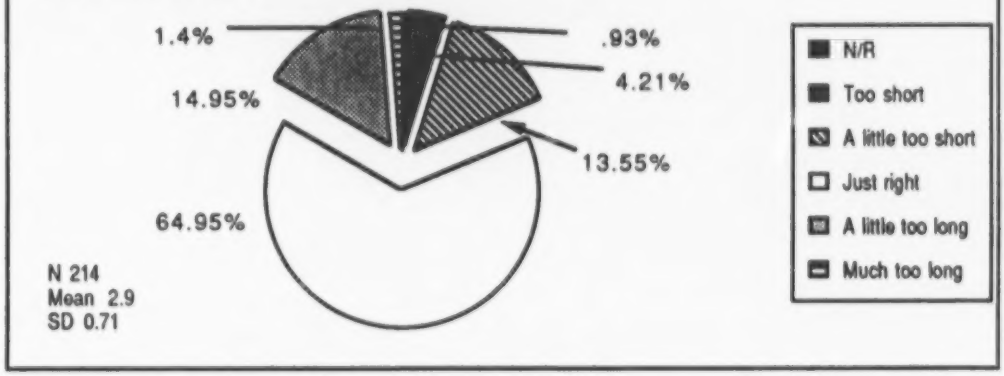
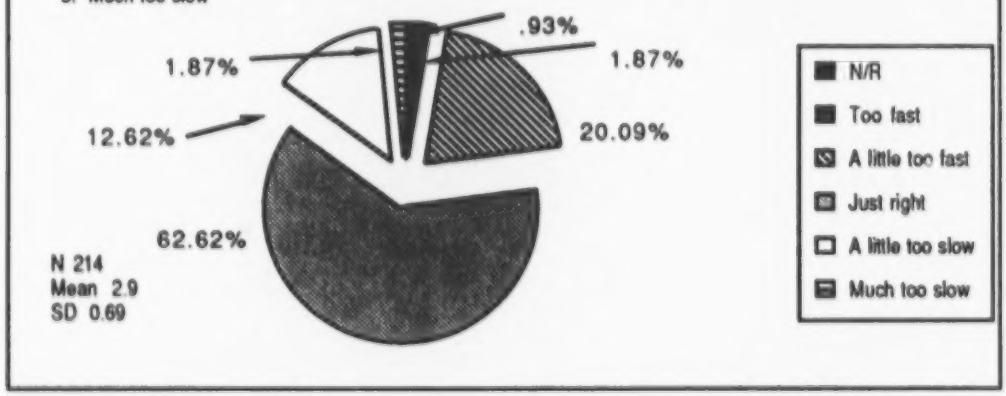


Figure 14

The pace of the training was: 1. Too fast, 2. A little too fast, 3. Just right, 4. A little too slow, 5. Much too slow



The data from the study clearly indicated that the great majority of participants wanted additional training and anticipated a need for moderate to substantial levels of support and assistance. Providing the depth of training requested has required development of several new sessions at the Sacramento center, regional training sessions around the state, and a mechanism for refresher/

follow-up training as new technologies have become available. (See Figures 15 and 16.)

Figure 15

Please rate your level of confidence concerning the use of software for cognitive rehabilitation (adapted computer technology) BEFORE the training.

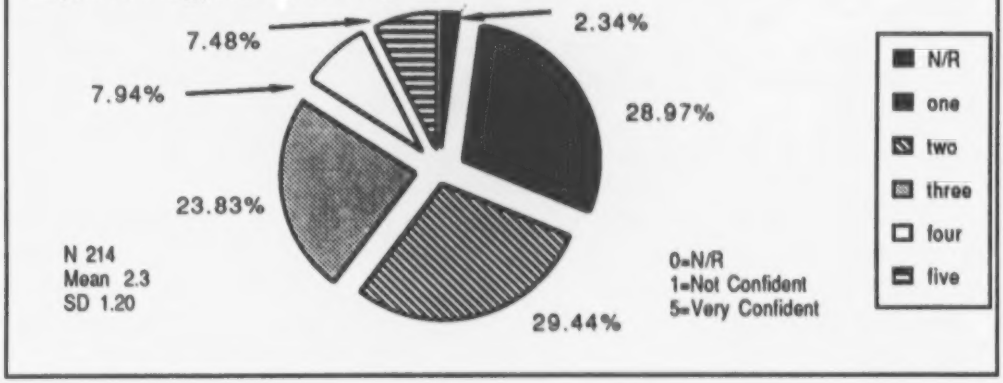
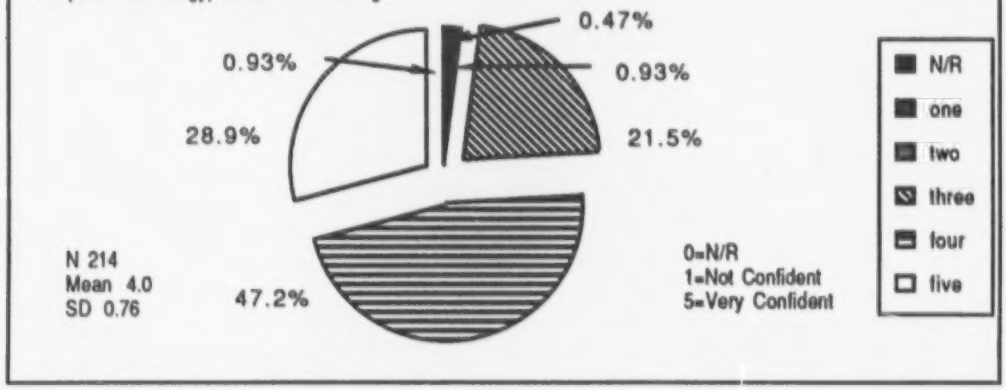
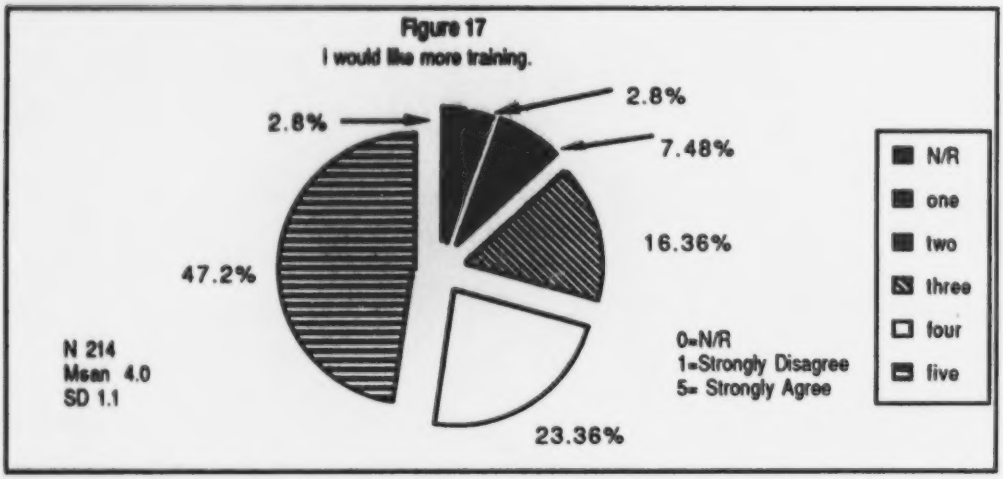


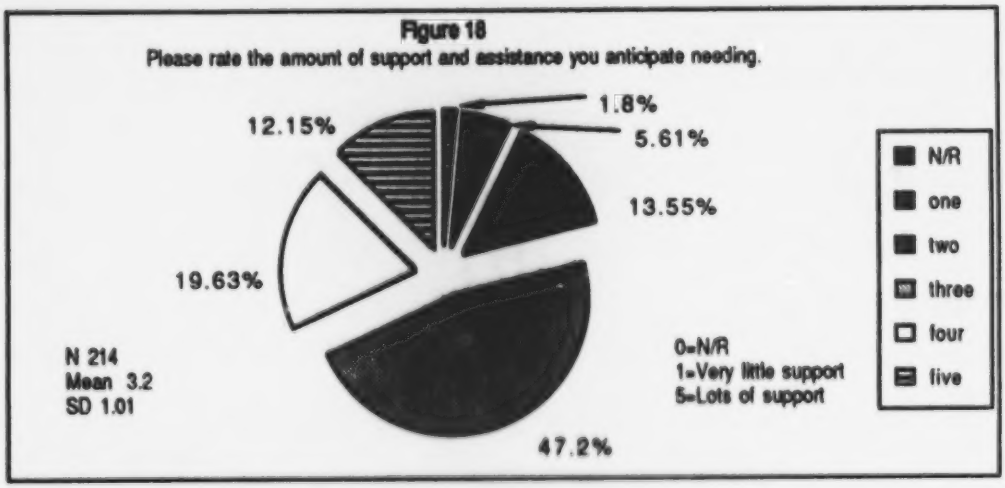
Figure 16

Please rate your level of confidence concerning the use of software for cognitive rehabilitation (adapted computer technology) AFTER the training.



Perhaps the most significant finding from this study was the dramatic increase in participants' confidence levels before and after training. While only 15 percent reported feeling quite confident in their ability to use and instruct students in assistive technologies before training, 76 percent reported feeling quite confident after training. It was also reassuring to learn that more than 97 percent of the participants reported very high levels of confidence in the ability of the High Tech Centers staff to provide the levels of future support and assistance trainees anticipated needing. (See Figures 17, 18, and 19.)

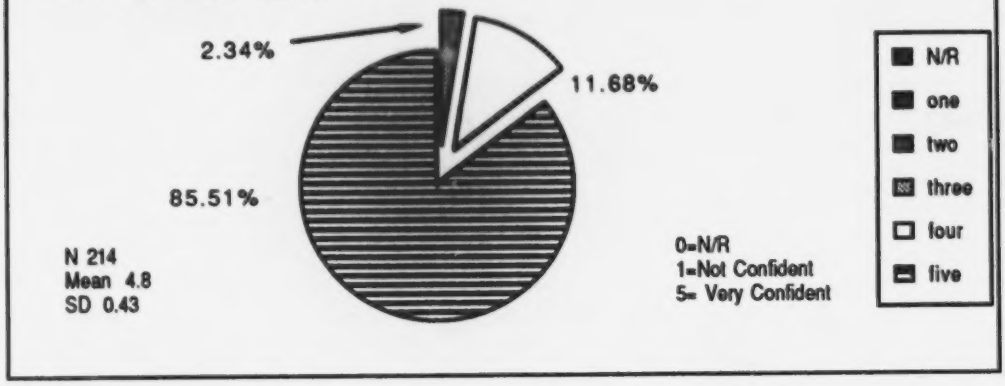




Campus High Tech Centers faculty appear to be very pleased with the quality and level of training and support provided by the High Tech Center staff. The training methods employed by the center are working well and have benefited from the modifications suggested by this study. Trainees are confident in their ability to use what they have learned, very interested in additional training, and extremely confident in the ability of High Tech Center staff to provide needed support and assistance.

Figure 19

Please rate your confidence in the ability of the High Tech Center staff to provide the level of support and assistance you anticipate needing.



The High Tech Center Training Unit provides a variety of support services for :

- Training Opportunities

To increase the skills of current High Tech Centers faculty and build foundation skills in new faculty members, the High Tech Center offers training in more than 15 topics covering all aspects of assistive and instructional technologies. The sessions range in duration from one to three days and are offered throughout the year. The subjects range from three-day training sessions in the basics of assistive computer technology to advanced instruction in the use of cognitive retraining software for students with acquired brain injuries. To date, the High Tech Center has provided such training for more than 400 participants.

- Telephone Support

A significant fraction of each working day at the High Tech Center in Sacramento is devoted to providing direct support to faculty at community college High Tech Centers throughout the state. The bulk of this support is provided over the telephone. The Sacramento Center provides support in a wide variety of areas including: evaluation of student access needs, instructional methodology, course development, equipment purchase, integration of assistive technology with campus computer networks, equipment maintenance and repair, software integration, current legislation related to computer access, availability of new technologies, and funding opportunities.

- Site Visits

Over the last two years, Training Unit staff have visited each of the campus High Tech Centers at least once. These visits will continue as a regular part of program operation. They represent a welcome opportunity for High Tech Centers faculty to receive personalized assistance with computer usage and access issues unique to their campus. These visits also allow Training Unit staff to continually monitor the effectiveness of overall program operation.

- Regional Meetings

Each year, the High Tech Center sponsors regional meetings of High Tech Centers faculty in northern and southern California. These meetings provide an opportunity to discuss and develop policy related to assistive and instructional computer technology, share new information, plan for the coming year, explore innovative new technologies, evaluate new instructional methods, and acknowledge the achievements of faculty at local High Tech Centers.

- In-Service Training

Once each year, the High Tech Center sponsors an in-service training opportunity for High Tech Centers faculty. The training provides learning experiences that are beyond the scope of the Training Unit in the Chancellor's Office. In December 1989, more than 50 faculty attended a one-day workshop at Stanford Children's Hospital Rehabilitation Engineering Center. The workshop focused on highly specialized assistive computer technologies for the severely disabled, a student population not adequately served by High Tech Centers at the present time.

- Electronic Communications

The Training Unit maintains an electronic bulletin board system (CC:) that provides information exchange, software updates, and electronic mail to every community college High Tech Center. Through the initial Foundation grant, modems and communications software were provided to each of these sites as well. The system is available to all DSP&S faculty and is being used regularly by more than 60 community colleges. Recently, the system was modified to provide an area that allows students enrolled in local High Tech Centers to communicate with their peers on other campuses throughout the state.

The High Tech Center Training Unit has produced a series of publications designed to improve the ability of college and university faculty to better understand and deliver assistive computer services for students with disabilities.

- Books

Through a grant from the U.S. Department of Education's Fund for the Improvement of Post-Secondary Education (FIPSE), the High Tech Center Training Unit has written and published *Computer Access in Higher Education* for Students with Disabilities, a two-volume book that deals comprehensively with the instructional, technical, and legal issues of computer access for students with disabilities. Several thousand copies of the book have been distributed at no charge to over 1,000 of the nation's largest colleges and universities, State and federal legislators, and the CEOs of the nation's leading corporations. Additionally, college presidents and DSP&S coordinators in each of California's three public segments of higher education have also received copies. The book has been adopted as a reference text by the Federal Government and is generally regarded as a national standard for guidelines in assistive computer technology.

- Training Guides

To assist faculty in making maximum use of the training available through the High Tech Center, a comprehensive series of training guides have been developed. Individual guides have been produced for each of the more than 75 assistive, productivity, and basic skills software programs used by the Center. These guides are provided during High Tech Center training sessions or are sent to faculty upon request.

- Instructional Guides

In cooperation with High Tech Center specialists from community colleges across the state and the DSP&S unit of the Chancellor's Office, the Training Unit has developed a 600-page, three-volume instructional guide. The guide provides a complete curriculum and supporting lesson plans, exercises, and examinations for all major instructional components of the High Tech Center program. It has been distributed to all campus High Tech Centers, and to other California community colleges upon request.

- Electronic Publications

All published materials are also available electronically on the bulletin board system (CC:). Additionally, the High Tech Center maintains an up-to-the-minute database of all assistive technologies it employs, using Apple Computer Corporation's Hypercard software. This database is also shared with all campus High Tech Centers.

The High Tech Center Training Unit has undertaken a number of cooperative agreements with private industry, other postsecondary institutions, and gov-

ernment agencies intended to increase the access and success of students with disabilities enrolled in the California Community Colleges.

- Cooperative Agreements with Private Industry

Just begun is an innovative project to explore the ability of students with disabilities to work productively in the area of computer assisted design (CAD). The project has been undertaken in cooperation with the Autodesk Corporation, selected community colleges, and participating local employers. Community college faculty from CAD departments, DSP&S, and High Tech Centers; students with disabilities; Autodesk staff; and local employers are working together to create a training program. This program will incorporate the best methods for teaching and using CAD products, along with the most advanced assistive computer technologies available. The goal is for the employers participating in the project to hire students who successfully complete the course and pass the CAD certification test designed by Autodesk.

- Cooperative Projects with Government

The Training Unit is a consulting member of panels formed by the National Science Foundation (NSF), the American Association for the Advancement of Science (AAAS), the United States Government's Clearinghouse on Computer Accessibility (COCA), as well as the President's and Governor's Committees on the Employment of Persons with Disabilities. The techniques and guidelines developed by the High Tech Center played a significant part in shaping both the Federal 508 regulations concerning computer access for persons with disabilities and the Federal Technology Assistance Act for persons with disabilities.

- Cooperative Projects with other Postsecondary Systems

Over the last three years, the High Tech Center has worked closely with staff from both the University of California and the California State University in helping these four-year institutions provide the levels of assistive computer technology available in most California community colleges. The High Tech Center has also provided information and support to a number of states interested in establishing programs based on the California model, including Oregon, Washington, Hawaii, Florida, New York, Massachusetts, Connecticut, Colorado, and Arizona.

All of these services are available at no charge through the High Tech Center Training Unit to qualified faculty or administrators from any California community college.

Summary and Conclusions

The California Community Colleges High Tech Centers program is about to begin its fourth year of operation. Student enrollment has grown steadily, with many colleges now forced to establish waiting lists for students who want to participate. Each year, additional community colleges that did not receive High Tech Center grants have taken steps to provide disabled students with access to computers through small "start-up" High Tech Centers. Anecdotal information collected from several colleges suggests that students with disabilities are registering significant gains in academic performance and mainstream participation as a direct result of access to assistive computer technologies. Community college faculty are uniformly enthusiastic and supportive of the program, in large measure because of the dramatic gains in academic performance, transition to mainstream courses, and enhanced self-esteem they have seen in their students.

The High Tech Centers program is an appropriate, and effective response to the mandates and guidelines established under Section 504 of the Rehabilitation Act, AB 77, AB 746 (Chapter 829, Statutes of 1987), and AB 1725 (Chapter 973, Statutes of 1988) with regard to equal access, supportive services, improved access to technology, and outreach to underrepresented students. Additionally, the Rehabilitation Act of 1973 was recently amended to create Section 508, which mandates accessibility to computer systems in federal agencies for all persons with disabilities. It is reasonable to assume that the new section, like Section 504 of the Act, will be found applicable at the state level as well.

In the coming months, two major issues face the High Tech Centers program:

- Transition of funding for campused-based High Tech Centers from the initial Foundation grant to local assistance.

In June 1990, funding off-campus-based High Tech Center faculty from the initial Foundation grant will expire. For the many community colleges that have received three years of program funding and have been assuming an increasingly larger percentage of High Tech Centers faculty costs each year, this transition will not present a major difficulty. Colleges that have not been able to assume a significant portion of faculty salaries or that have had less time in which to budget for this cost may be unable to maintain their current High Tech Centers staffing patterns after June 1990. To prevent serious disruption of High Tech Centers programs and services, the Chancellor's Office has submitted a budget change proposal (BCP) to the Governor for $1.3 million in local assistance to meet the cost of maintaining highly trained and experienced faculty at all of the community colleges' High Tech Centers.

- Relocation of the High Tech Center Training Unit to a community college campus.

Given the expansion of training and support that has occurred over the past three years, a community college campus would be the most appropriate location for the

High Tech Center Training Unit. A campus location would provide: (1) greater accessibility to faculty; (2) inclusion of students in the testing and evaluation of new technologies; (3) expanded cooperative undertakings with business and industry; and (4) increased participation by other segments of postsecondary education.

Future Focus

In concluding this report to the Board of Governors, two future issues to be addressed by the High Tech Centers for the Disabled are noted:

- A major, new outcomes study

The long-term effects of access to assistive computer technology on the academic performance, completion of core curriculum, and transfer to four-year institutions or acquisition of vocational certificates by students with disabilities should remain a major focus of study by the High Tech Center Training Unit. It is anticipated that when the student information component the Chancellor's Office Management Information System becomes operational, studies can be conducted that will precisely measure changes in the academic performance of students with disabilities before and after High Tech Centers training.

- The development of additional California Community College High Tech Centers sites

Research has clearly revealed the extent to which the High Tech Centers programs provide the majority of students with disabilities a first opportunity to learn about and use computers. The value of this finding cannot be overstated. It strongly suggests that the majority of students with disabilities attending community colleges that do not have High Tech Centers have received little if any training in computers and computer access systems through existing campus programs. It is vitally important to both the academic and employment future of these students that consideration be given to the establishment of High Tech Centers on these remaining campuses as quickly as possible.

The High Tech Centers for the Disabled has been, by any standard, an enormously successful and effective program. Both concrete and anecdotal data suggest dramatic gains in student performance. Faculty in the Disabled Student Programs and Services Units of local community colleges are genuinely excited and enthusiastic over the very real improvements they are seeing in High Tech Centers students on a daily basis. The High Tech Centers program and the resource materials it has produced are now the national standard against which all other programs are measured or modeled. In a very real sense, the High Tech Centers program has played a major part in shaping national policy with regard to equal access to computers and awakening postsecondary education to the expanded opportunities available to persons with disabilities through the use of assistive computer technology.

The California Community Colleges lead the nation in guaranteeing access and opportunity for students with disabilities. Maintaining that lead will require innovation, commitment, and a sincere desire to provide equal educational opportunities through which students can succeed on the basis of their own merits rather than falter on the circumstances of their disability.

APPENDIX

High Tech Center Grant Sites

Antelope Valley College
Bakersfield College
Butte College – CARLO
Cabrillo College
Canyons, College of the
Cerritos College
Cuesta College
Cypress College
Desert, College of the
Diablo Valley College
East Los Angeles College
El Camino College
Evergreen Valley College
Fresno City College
Fullerton College
Glendale Community College
Hartnell College
Imperial Valley College
Irvine Valley College
Laney College
Lassen College
Los Angeles Harbor College
Los Angeles Mission College
Los Angeles Pierce College
Marin Community College
Merced College
Merritt College
Modesto Junior College
Monterey Peninsula College
Moorpark College
Mt. San Antonio College
Oxnard College
Palomar College
Pasadena City College
Rancho Santiago College
Redwoods–Del Norte, College of the
Redwoods–Eureka, College of the
Rio Hondo College
Saddleback College
San Diego Mesa College
San Francisco Community College Centers
San Joaquin Delta College
San Mateo, College of
Santa Barbara City College
Santa Monica College
Santa Rosa Junior College
Sequoias, College of the
Solano Community College
Ventura College
West Valley College
Yuba College

High Tech Center Non-Grant Sites

Alameda, College of
Allan Hancock College
Chabot College
Chaffey College
Citrus College
Contra Costa College
Foothill College
Lake Tahoe Community College
MiraCosta College
San Jose City College
Shasta College
Sierra College
Southwestern College
Vista College

ERIC Clearinghouse for
Junior Colleges MAR 16 1990